Team 7 – Project 2

Project Topic - Bluebikes Management System

Team Members

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Problem statement

Bluebikes ride sharing is one of the highlights of the bicycle transportation in Boston. It is an essential mode of commute for students. Bluebikes are easily available and affordable promoting self-distancing during pandemic.

The model that we propose ensures a smooth transaction and provides the rider with an efficient and smooth ride around the city.

Through our model, we wish to solve problems related to

1. Bluebike renting system has challenges due to payment issues and slow loading of the application. Common issues faced by the users are – not being able to rent or return bikes,etc.
2. Fare calculation for the bikes according to time duration covered,membership mode of user and accepting discount coupons.
3. Providing membership options: Weekly pass, Monthly pass, annual.
4. Ensure user data privacy and storage of past user reservations, bike inventory and creating data accessibility by roles and requirements.
5. Scalability of the application for availability in different regions of the city, state etc.

Objectives

1. Providing a smooth bike renting service to all riders at best prices
2. Boosting the application with better DB design for a better User experience, ensuring higher user retention.

Proposed Solution

Solution is broken down into three areas:

1. **Booking management** - Setting up account, take a subscription, book a bike, call a customer care, making a payment
2. **Customer Care management** – Assign/ Pick tickets from queue.
3. **Employee management** – Employee details log

Booking Management

- Allowing the user to connect with the nearest Bluebike station by using the Bike/ rental/docking Table and Customer Table.
- Book the bike seamlessly using the app where they will get details from the Rent table (payment id)
- Calculate the time of ride using Rental table(difference between Drop time and start time and multiply with multiplicative factor consisting of coupon code, membership type and fixed rate/hour)
- Easy Cost calculation using the rental, discount and membership table.

Customer Care

- Ensure fast customer service by assigning an agent immediately using the Customer, Rental, Dock, Ticketing queue and Employee table

Employee Management

- Tracking employee in company and check if they belong to customer care service or who are their managers using Employee table

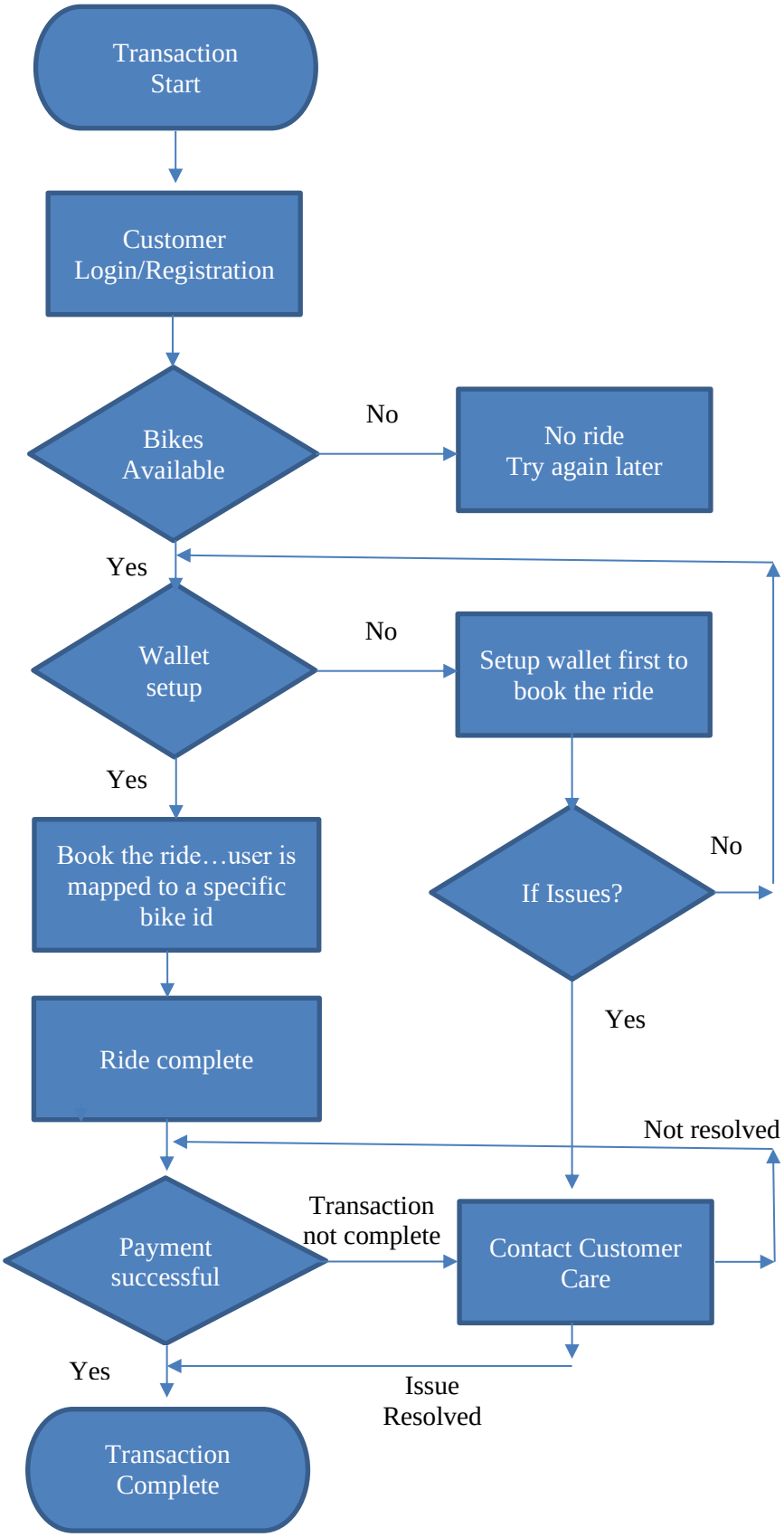
Assumptions and Facts

- One customer can book only one bike at a time.
- Customers will have to return the bike before booking a new bike.
- A single discount coupon is used during payment.
- A dock can have multiple bikes at any given time. A dock can have a minimum of zero bikes when all bikes have been taken by customers.
- Membership and discounts can be null. It is possible that a customer booking a bike is not a member and is not using any discount while booking a bike.
- Membership id is not unique to each customer.
- We will have a fixed number of coupons available.
- All employees including customer care along with reporting managers are known as employees Bluebikes.
- There are only three membership plans: Weekly, Monthly, and Yearly Pass
- Discounts apply to customers who can be members or non-members
- The customer returns the bike after the ride at the dock and completes the necessary payment
- Each payment is calculated using the time difference between drop and pick up time and multiplicative factors like rate/hour, discount, and membership factor
- All Bluebike are currently functioning only in Boston USA

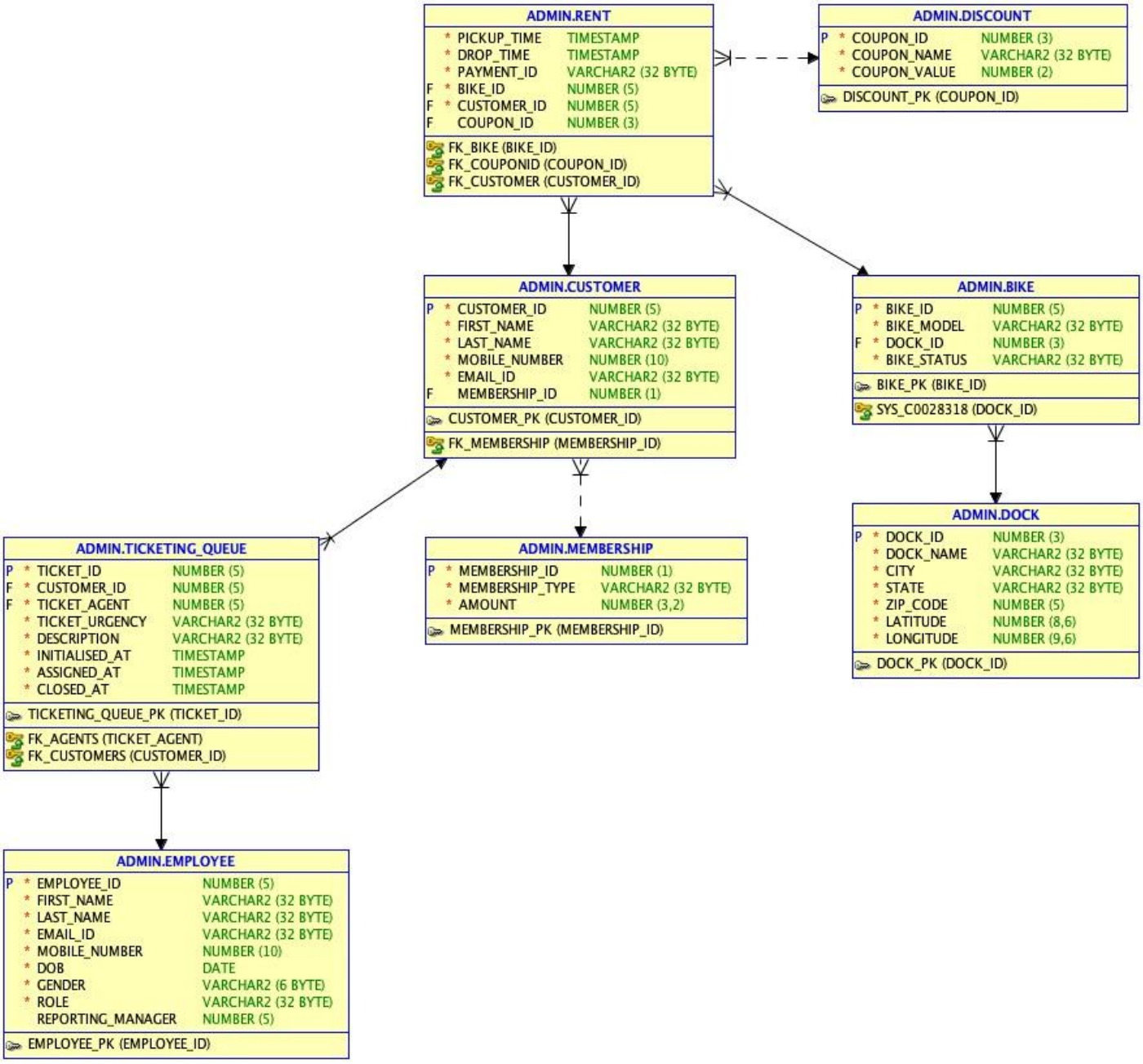
Flow Diagram (Shown on next page)

1. Transaction Start- User downloads the app
2. Customer Login/Registration- Creates an Account
3. Bike Available - Give necessary permissions (location) and books the ride
4. Wallet setup- Give details of credit/debit for payment, if any issue arrives, contacts the customer care
5. Book the ride- Gets the specific bike id, gets the code on phone, enters the code at dock station and unlocks the bike
6. Ride complete- After the completion of the ride, dock the bike back at the nearest station
7. Transaction complete- Amount will be deducted automatically based on the time consumed and multiplicative factor using membership code, discount coupon and fixed rate/hour

Flow Diagram



Entity Relationship Diagram



Entity Tables :

CUSTOMER

Attributes	Data Type	Comments	Description
CUSTOMER_ID	NUMBER(5)	PRIMARY KEY	A unique ID to identify each customer
FIRST_NAME	VARCHAR(32)	NOT NULL	Customer First name
LAST_NAME	VARCHAR(32)	NOT NULL	Customer Last Name
MOBILE_NUMBER	NUMBER(10)	NOT NULL	Customer Mobile Number
EMAIL_ID	VARCHAR(32)	NOT NULL	Customer Email ID
MEMBERSHIP_ID	NUMBER(1)	FOREIGN KEY	Customer Membership ID if he possesses any membership

MEMBERSHIP

Attributes	Data Type	Comments	Description
MEMBERSHIP_ID	NUMBER(1)	PRIMARY KEY	A unique ID to identify the kind of membership
MEMBERSHIP_TYPE	VARCHAR(32)	NOT NULL	Membership description eg- weekly, monthly, yearly
AMOUNT	NUMBER(3,2)	NOT NULL	Membership Amount Paid by the Customer

BIKE

Attributes	Data Type	Comments	Description
BIKE_ID	NUMBER(5)	PRIMARY KEY	A unique ID to identify a bike
BIKE_MODEL	VARCHAR(32)	NOT NULL	Model/Design of the bike
BIKE_STATUS	VARCHAR(32)	NOT NULL	Describes whether the bike is available or in use
DOCK_ID	NUMBER(3)	FOREIGN KEY	The Dock ID where the bike is docked

DOCK

Attributes	Data Type	Comments	Description
DOCK_ID	NUMBER(5)	PRIMARY KEY	A unique ID to identify the different docks around the city
DOCK_NAME	VARCHAR(32)	NOT NULL	Dock Name where the bikes are docked
ZIP_CODE	NUMBER(5)	NOT NULL	Zip Code of the location where the doc is present
STATE	VARCHAR(32)	NOT NULL	State where the bike operates
LATITUDE	NUMBER(8,6)	NOT NULL	Latitude of the bike
LONGITUDE	NUMBER(9,6)	NOT NULL	Longitudinal Location of the bike
CITY	VARCHAR(32)	NOT NULL	City where the bike operates

RENT

Attributes	Data Type	Comments	Description
PICKUP_TIME	TIMESTAMP	NOT NULL	The time when a bike was activated/undocked for a ride
DROP_TIME	TIMESTAMP	NOT NULL	The time when a bike was deactivated/docked after a ride
PAYMENT_ID	VARCHAR(32)	NOT NULL	The unique ID used to complete the payment
BIKE_ID	NUMBER(5)	FOREIGN KEY	The bike ID of the bike which was used for the ride
CUSTOMER_ID	NUMBER(5)	FOREIGN KEY	The ID of the Customer using the bike for a ride
COUPON_ID	NUMBER(3)	FOREIGN KEY	ID of any coupon used during the ride

DISCOUNT

Attributes	Data Type	Comments	Description
COUPON_ID	NUMBER(3)	PRIMARY KEY	ID of any coupon available
COUPON_NAME	VARCHAR(32)	NOT NULL	Name of any coupon used during the ride
COUPON_VALUE	NUMBER(2)	NOT NULL	Value of the coupon used during the ride

EMPLOYEE

Attributes	Data Type	Comments	Description
EMPLOYEE_ID	NUMBER(5)	PRIMARY KEY	Unique ID for each employee
FIRST_NAME	VARCHAR(32)	NOT NULL	Employee First Name
LAST_NAME	VARCHAR(32)	NOT NULL	Employee Last Name
DOB	DATE	NOT NULL	Employee Date Of Birth
GENDER	VARCHAR(6)	NOT NULL	Employee Gender
ROLE	VARCHAR(32)	NOT NULL	Employee Role/ Designation
REPORTING_MANAGER	VARCHAR(32)	NOT NULL	Reporting Manager of the Employee
MOBILE_NUMBER	NUMBER(5)	NOT NULL	Employee Contact Number

TICKETING_QUEUE

Attributes	Data Type	Comments	Description
TICKET_ID	NUMBER(5)	PRIMARY KEY	A unique Ticket/Issue ID generated whenever any issue is raised by the customer
CUSTOMER_ID	NUMBER(5)	FOREIGN KEY	Customer ID of the customer for whom the ticket is raised
TICKET_AGENT	NUMBER(5)	FOREIGN KEY	The agent ID of the agent who has raised the ticket of the customer
TICKET_URGENCY	VARCHAR(32)	NOT NULL	Issue priority eg :- Easy, High, Medium
DESCRIPTION	VARCHAR(32)	NOT NULL	The description of the issue faced by the customer
INITIALISED_AT	TIMESTAMP	NOT NULL	Time and date when the ticket has been raised
ASSIGNED_AT	TIMESTAMP	NOT NULL	Time and date when the ticket has been assigned to an agent
CLOSED_AT	TIMESTAMP	NOT NULL	Time and date when the ticket has been resolved/closed